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**THE LOCAL AND REGIONAL
ECONOMIC IMPACTS OF THE
PORT OF OAKLAND**

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**PREPARED FOR THE
PORT OF OAKLAND
DECEMBER 5, 1991**

**MARTIN O'CONNELL ASSOCIATES
2938 COLUMBIA AVE. SUITE 602
LANCASTER, PA. 17603 (717) 295-2428**

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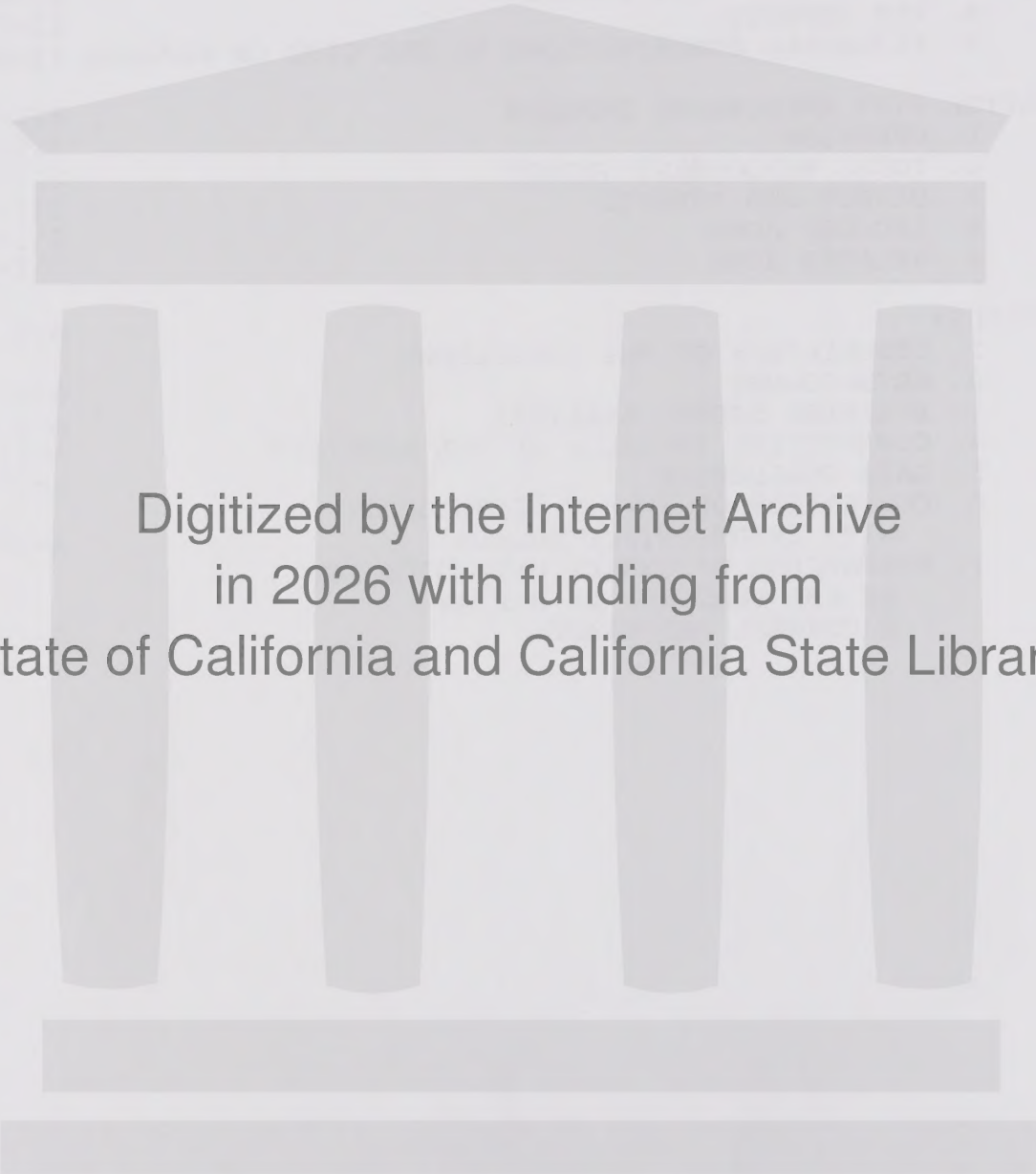
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ECONOMIC IMPACTS - MARITIME OPERATIONS 1990

SUMMARY

The Port of Oakland is located in the fourth largest metropolitan area (CMSA) in the United States. The area contains a population of 6,104,000 (1990 census) and ranks fourth in the nation in purchasing power. In addition, the Port's Marine Terminal Facilities rank as the fourth largest container port in the nation. To understand the contribution of the Port's maritime operations to the local, regional, state and national economies, the Port recently conducted an economic impact study. The contribution or impacts of the Port on the economy is directly seen in terms of:

- jobs,
- business revenue, and
- personal earnings,
- local, county and state taxes

Over 188,000 jobs are related in some way to the movement of cargo across the Oakland marine terminals. When considering the personal income related to the directly dependent jobs, as well as a responding effect, the result is \$430.1 million in personal income and consumption expenditures for California residents.

The Port generated \$729.2 million in direct operating revenue for businesses providing maritime services for cargo and vessels. In addition, \$38.3 million in state and local taxes were generated through that business activity at the Port. Each year, depending upon the revenue surplus, the Port also makes financial contributions to the City of Oakland. Table I-1 summarizes these impacts generated by the Port in 1990.

Table I-1
Economic Impacts of Maritime Operations
Port of Oakland, 1990

Employment Impacts	
direct (Bay Area)	6,700 jobs
induced (Bay Area)	2,800 jobs
related Port users (Bay Area/State)	179,300 jobs
Personal Income Impact (Bay Area/State)	\$430.1 million
Financial Contribution to the City of Oakland	\$ 6.6 million
State and Local Taxes	\$ 38.3 million
Business Revenue Impact	\$729.2 million

NOTE: These impacts cannot be added together since personal income and taxes are paid from the business revenue impact. Also, each impact is unique and must be measured separately.

ECONOMIC IMPACTS - MARITIME OPERATIONS 1990

METHODOLOGY

The Port of Oakland retained the services of Martin O'Connell Associates to conduct the business survey and to do the economic impact analysis. The methodology used in the analysis has been used by Martin O'Connell Associates in the last four years to measure the economic impacts of maritime activity at more than 40 ports in the United States and Canada.

Generally described, an economic impact analysis looks at the flow of impacts generated by seaport activity. The activity of a vessel docking and then loading and discharging cargo immediately generates business revenue to the companies that provide cargo handling and vessel services. This revenue is in turn used to purchase goods and services from other firms and to purchase employment to provide these services. This revenue is also used to accrue retained earnings, to make capital investments, and to pay stockholder dividends. Additionally, local, county, state and federal taxes are paid from this revenue.

The 1990 impact estimates for the Port of Oakland are based on the results of nearly 400 telephone interviews with businesses in the Bay Area maritime industry. These interviews were conducted during June, July and August of 1991. The interviews were used to identify employment, salaries, business revenue, residency of employees, cargo handling productivity and dependency of the business activity on cargo shipments and receipts transported through the Port of Oakland facilities. In addition, an induced multiplier has been developed to measure the impacts of purchases by those directly employed through marine activity in the Port.

A computer model has been developed which will provide the Port of Oakland with a tool in evaluating the impact of changes in the maritime operations, such as tonnage and container throughput, facility development plans, dredging scenarios, changes in the intermodal operations at the Port, and changes in productivity and vessel size.

II. REVENUE, INCOME AND TAX IMPACTS

1. OVERVIEW

In this chapter, the revenue, personal income and tax impacts of the Port of Oakland are described. It is concluded that:

- . During 1990 the Port of Oakland generated \$729.2 million in direct operating revenue for businesses providing maritime services to cargo and vessels at the Port.
- . \$220.5 million was distributed as personal income to residents of the state of California. After considering the respending effect, this resulted in \$430.1 million in personal income and consumption expenditures for California residents.
- . Containers generate the largest total revenue impact. Refrigerated containerized cargo generates the greatest revenue impact on a per container basis.
- . Port activity at Oakland in 1990 generated \$38.3 million of state, county and local tax receipts.
- . In 1990, the Port of Oakland made \$6.6 million in financial contributions to the City of Oakland.

2. REVENUE IMPACT

This section documents the business revenues generated from providing maritime services to cargo and vessels at the Port of Oakland. The current study estimates that approximately \$729.2 million of revenue is generated by Port activity in 1990. The revenue impacts local, regional, state and national economies. Table II-1 presents a breakdown of the total revenue estimated to have been generated by port activity in 1990.

TABLE II-1
Total Revenue Generated by
Port Activity, 1990

IMPACT SECTOR	REVENUE (MILLIONS)	PERCENT OF TOTAL
SURFACE TRANSPORTATION	\$376.1	51.58%
MARITIME SERVICES	\$309.1	42.39%
PORT OF OAKLAND	\$36.8	5.05%
BANKING/INSURANCE	\$7.2	0.99%
TOTALS	\$729.2	100.00%

Note: The port user revenue (ie., the value of cargo shipped or received through the Port) is excluded. This is because this chapter is concerned with revenue generated from maritime services related to the movement of cargo moving over the Port facilities.

The revenue generated by specific commodity group movements via the Port is next evaluated and presented in Table II-2. This per container (and per metric ton for break bulk commodities) analysis demonstrates the importance of each type of commodity movement in terms of revenue generation to those firms providing vessel and cargo handling services at the Port of Oakland. It is to be emphasized that only revenue that can be assigned to a specific commodity handling type is included in this commodity specific analysis. For example, revenue received by the banking and insurance sector and by firms engaged in marine construction is not included, since it is not possible to isolate these activities to a specific commodity group. Therefore, it is the revenue impact per container (or metric ton for break bulk commodities) that is of interest in this chart.

In terms of total revenue, dry containerized cargo generates the greatest revenue impact, followed by refrigerated containerized cargo. On a per container basis, refrigerated

containerized cargo creates the largest revenue per container impact compared to dry containerized cargo. This reflects the labor intensive handling requirements associated with refrigerated containerized cargo, such as the transloading of refrigerated cargo from box cars to marine containers.

TABLE II-2
Revenue Impacts by Commodity
1990

COMMODITY GROUP	REVENUE (MILLIONS)	REVENUE PER CONTAINER	REVENUE PER METRIC TON
CONTAINERS: DRY	\$596.4	\$996	NA
CONTAINERS: REFRIGERATED	\$92.2	\$1,440	NA
BREAK BULK	\$12.2	NA*	\$32
ALLOCATED REVENUE	\$700.8		
REVENUE NOT ALLOCATED BY COMMODITY	\$28.4		
TOTAL REVENUE	\$729.2		

* Not applicable

Note: The non-attributable revenue item in Table II-2 consists of the portion of the total revenue impact that does not relate specifically to vessel and cargo handling services of the commodity groups identified in the table. For example, the non-attributable revenue allocation includes revenue generated in the banks and insurance companies and by businesses performing marine construction and repair. Also included in the non-attributable revenue is a portion of revenue earned by the Port of Oakland from maritime operations. U.S. Customs receipts generated by import cargo moving over the Port of Oakland facilities is excluded from all measures of revenue.

2.2. Revenue Methodology

The movement of cargo via the Port of Oakland generates revenue for each of the five economic sectors.

- . Surface Transportation Sector, which consists of the railroads and trucking firms moving cargo to and from the Port of Oakland.
- . Maritime Services Sector, which includes terminal operators, steamship agents/lines, warehousing, pilots, towing firms, chandlers, surveyors, etc.
- . Port Sector, which consists of the Maritime Division of the Port of Oakland and a portion of other Port staff

who provide support to maritime operations; for example Harbor Facilities staff, Marine Engineering staff and Planning staff.

- . Banking and Insurance Sector, which consists of divisions of banks and insurance companies providing services to ocean carriers and users of the Port of Oakland. Also, maritime lawyers providing direct services to entities directly involved with maritime activity at the Port of Oakland are included in this sector.
- . Exporters and Importers Sector, which consists of the businesses that export and import cargo over the Port of Oakland marine facilities. Businesses in this category are classified as either directly dependent upon the Port or related to the Port. The first type of businesses typically export and import cargo over their own private facility at the Port, while the businesses categorized as related use multiple ports for export and import cargo. These related exporters and importers could substitute another port for the Port of Oakland with little or no impact on their overall operations.

For example, revenue is received by the surface transportation firms (both railroads and trucks) as a result of moving export cargo to the Port and distributing the imported commodities inland after receipt at the Port. The firms in the maritime service sector receive revenue from arranging for transportation services, cargo handling, providing services to vessels in port and repairs to vessels calling the Port. The banking and insurance sector receives revenue from financial services provided to users of the Port. The Port of Oakland receives revenue from terminal leases, wharfage and dockage charged to cargo and vessels at the Port, and crane rentals and space assignments at the Port of Oakland. In addition, revenue is received by shippers/consignees from the sales of cargo shipped or received via Port of Oakland marine cargo facilities and from the sales of products made with raw materials received through the Port. Since this chapter is concerned with the revenue generated from providing maritime services, the revenue generated by the sales of imports and exports (i.e., the value of the cargo shipped or received by users of the Port) will be excluded from the remaining discussion. Therefore, there is no measured revenue impact for related users of the Port.

The revenue generated by port activity is used in several ways. For example, gross revenue is used to pay employee salaries and taxes, it is distributed to stockholders, and it is used for the purchases of equipment and maintenance services. Of these components, only two can be isolated geographically with

any degree of accuracy. The first is the personal income component of revenue, which can be traced to geographic locations based on the residence of those receiving the income. The balance of the revenue is distributed in the form of payments to firms providing goods and services to the five sectors, for the distribution of company profits to shareholders and to payment of state, local, and federal taxes. Many of these firms and owners are located outside of the Bay Area and the state of California, and, thus, it is difficult to trace the ultimate location of the distributed revenue (other than personal income). The second component of revenue that can be isolated to a state or local region is the state and local tax impact.

Since it is difficult to trace the revenue beneficiaries, an estimate of revenue is developed, but no conclusions are formulated as to how the revenue (other than personal income and state and local taxes) is distributed, geographically. It is more accurate to trace the distribution of personal income (which is a subset of revenue) through the geographic locations of individuals receiving the income.

2.3 Revenue Impacts by Sector

The revenue generated by the surface transportation sector is based on the relevant modal (rail or truck) rate for a commodity multiplied by the tonnage of that commodity moved to and from the Port by the specified mode. The share of each commodity transported by rail and truck was estimated from interviews with the terminal operators handling the respective commodities, as well as from interviews with ocean carriers serving the Port.

The relative modal shares are then applied to the 1990 Port throughput of the specific cargo. Average rail rates were obtained from ocean carriers and the railroads serving the Port. These rates are multiplied by the tonnage of each commodity carried by rail to estimate revenue accruing to railroads. The trucking rates are based on interviews with local trucking companies.

The railroads received 67 percent of the surface transportation revenue impact, while the trucking companies received the remaining 33 percent.

The \$309.1 million in revenue accruing to the maritime service sector is estimated from interview results with terminal operators who provided stevedoring revenue per container (or metric ton for break bulk cargoes) estimates for each commodity. Revenue impacts for pilotage and harbor tug assists are based on revenue per tug and pilotage assignments, as estimated from interview results. Revenue impacts for other maritime service sector company types are based on the percentage of revenue paid out in salaries (in each category). The ratio of salaries to

revenue by category is estimated from the survey data. Since salaries can be estimated with a greater degree of accuracy than revenue, the salary estimate combined with the ratio of total revenue paid out in salaries is used to estimate revenue impacts for each business type in the maritime service sector.

The \$7.2 million in revenue was generated by the local banks, law firms and insurance brokers as a result of international financial transactions and the provision of marine and cargo insurance and legal services. These revenue impacts are based on the ratio of total salaries to total revenue, as gathered through the surveys.

The Port of Oakland received about \$36.8 million in revenues, from leases with terminal operators, the collection of wharfage and dockage charged to cargo and vessels using the Port, and from crane rentals and space assignments.

In addition to these revenue sources, the U.S. Customs estimates that it collected \$462.3 million in U.S. Customs receipts for cargo imported over facilities at the Port of Oakland. U.S. Customs receipts go directly to the Federal Government, and are not included in the revenue impact summary tables.

In the next section of this chapter, the income impacts of the Port are described.

3. PERSONAL INCOME IMPACTS

In the previous section of this chapter, the total revenue generated by port activity was identified. As described earlier, the personal income received by those directly dependent upon port activity is one of the two components of revenue that can be traced to the state of California with any degree of accuracy.

The income impact is estimated by multiplying the average annual earnings of each port participant, i.e., railroad employees, truckers, steamship agents, freight forwarders, bankers, insurance agents, etc., by the corresponding number of jobs in each category. The individual annual earnings in each category multiplied by the corresponding job impact resulted in \$220.5 million in personal income.

Based on interviews with officials from the U.S. Bureau of Economic Analysis, it is assumed that for every one dollar earned by California residents as a result of jobs directly generated by port activity, an additional \$.95 of income would be created as a result of respending the income for purchases of California-produced goods and services. Hence, an income multiplier of 1.95 was used to estimate the total income impact of \$430.1 million, inclusive of the respending effect. This

additional respending of the direct income generates the 2,859 induced job impact, described in the next Chapter. (1)

4. TAX IMPACTS

State and local tax impacts, the other component of revenue that can be isolated to a geographic area, are estimated as follows. Total tax revenues collected at the state, county and municipal levels are collected from the Office of the Controller, the Governor's Budget Summary, and the Franchise Tax Board for the fiscal year ending June, 1991. These are collections from all sources (firms and individuals). An index is then developed by dividing total tax receipts at each level of government (state, county and municipal) by total state employment. These indices are then multiplied by the direct and induced job impacts to estimate the state, county and local tax impacts generated by port activity at Oakland.

The state, county and local taxes for which estimates have been developed include:

- . State and local income tax
- . State sales tax
- . Motor vehicle registration and licensing tax
- . State motor fuel tax
- . County property taxes
- . Local City taxes such as the possessory interest tax, utility consumption tax, sewer service charge tax, and business license tax are included.

Using these tax burdens, it is estimated that port activity at the Port of Oakland generated \$38.3 million of state and local taxes. Table II-3 indicates that of this \$38.3 million of tax revenue, \$22.6 million was state tax receipts, \$5.8 million of tax revenues was generated at the county level, and \$9.9 million at the local levels. For purposes of measuring the local, regional and state economic impacts of the Port of Oakland, Federal taxes are not estimated for this study.

(1). The respending impact of \$209.6 million includes the income related to induced jobs as well as personal consumption expenditures. Therefore, the respending impact cannot be divided by induced employees to estimate induced jobs salaries, as this would overstate the earnings of the induced jobs.

TABLE II-3
Summary of Tax Impacts

JURISDICTION	MILLIONS OF DOLLARS
STATE TAX IMPACTS	\$22.6
COUNTY TAX IMPACTS	\$5.8
LOCAL TAX IMPACTS	\$9.9
TOTAL STATE AND LOCAL TAX IMPACTS	\$38.3

5. PORT FINANCIAL CONTRIBUTIONS TO THE CITY OF OAKLAND

In addition to tax impacts, the Port of Oakland makes direct financial contributions to the City of Oakland. Over the past 10 fiscal years (1980/81 through 1990/91) the Port's Board has transferred over \$68.5 million from the Port Revenue Fund to the City of Oakland General Fund. In the past 2 fiscal years (1989 through 1991) the Port has transferred an average of \$6.6 million each year.

The City of Oakland is the trustee to whom the State Legislature has granted tideland trust property over the past 100 years. That property makes up the greater part of the land area for the seaport and a large portion of the airport facilities. The City Charter delegates to the Port Board the complete and exclusive power and duty on behalf of the City of Oakland to administer the State trust. The Port is a Department of the City of Oakland and the Port Board of Commissioners are public officials of the City. Practically all Port Revenue Fund monies are tideland trust funds.

During the cited 10 years, the financial contribution to the City has ranged from a low of \$3.4 million to a high of \$10.9 million. By law, a transfer may be made only if there is a legally valid obligation and (except for approximately \$1 million or less annually paid for Special Services) only from Port funds that the Board of Port Commissioners determine are surplus and not required for any other Port purpose.

Of the Port transfers to the City over the past 10 years, \$15.9 million has covered various special services and general services provided by the City of Oakland to the Port of Oakland

including administrative, personnel, financial, police, fire and other services. The balance of the monies, \$52.6 million, has covered the two general obligation bonds (in 1925 and in 1955) used to finance capital improvements to the Port's harbor and airport facilities. The latter amount covers principal, debt service and interest on debt service.

Since the early 1930's the Port has not received any financial support from the City other than those two general obligation bonds cited. The Port is not supported by City of Oakland tax subsidies. Many other ports in the United States, such as the Port of Seattle, do receive substantial local or other types of tax subsidies.

III. EMPLOYMENT IMPACTS

1. OVERVIEW

In this chapter, the employment impacts have been evaluated. The study concludes that:

- . About 188,851 jobs are in some way related to the movement of cargo over public and private facilities at the Port of Oakland.
- . Of these 188,851 jobs, 6,692 jobs were directly generated by port activity at Oakland. As a result of purchases of California-produced goods and services by these 6,692 employees, 2,859 additional induced jobs for California residents were created.

The chapter is organized as follows:

- . First, the total employment that is in some way related to the activities at the Port is estimated.
- . Second, the subset of total employment that is judged to be totally dependent on port activity is analyzed in three ways:
 - In terms of key economic sectors, e.g., surface transportation sector
 - For the major commodity groups
 - by the residency of those directly employed by activity at the Port of Oakland.
- . Third, induced jobs are analyzed.
- . Fourth, jobs related to the Port of Oakland are described.

2. TOTAL EMPLOYMENT IMPACT

It is estimated that 188,851 residents of the state of California are related to port activities at Oakland. Of the 188,851 jobs:

- . 6,692 jobs are generated by activities at the Port, and if such activities should cease, these jobs would be discontinued over the short term.

- . 2,859 people are employed by providing goods and services to the 6,692 individuals directly involved with Port activity. Consequently, employment in this group is as directly dependent upon the Port activity as the first group.
- . An additional 179,300 residents are employed by business organizations that use the services provided by the Port. Of the 179,300 related jobs, 157,100 related jobs are with businesses exporting and importing dry containerized cargo through the Port of Oakland. An additional 1,200 related jobs are with businesses exporting and importing refrigerated cargo through the Port of Oakland, while 21,000 related jobs are with firms shipping and receiving break bulk cargo over the Port's marine terminals. These jobs are considered to be related to activities at the Port, but the degree of dependence on the Port is difficult to estimate. If the Port of Oakland were not available to these organizations, they would suffer an economic penalty over the longer term. Such a penalty would vary from a loss of employment opportunities in some cases to an increase in total transportation costs in other cases, which could in turn, result in employment reductions.

The difference between related and direct employment is highlighted by the following example. It is estimated that about 157,100 jobs with businesses that ship and receive dry containerized cargo use the Port of Oakland to some degree for their shipments and receipts of cargo. For example, these businesses include manufacturing firms, agricultural businesses and exporters and importers, i.e., those businesses which ship and receive export and import items.

However, the degree to which these exporters and importers use the Port varies, since these same companies also use other ports. For the most part, these exporters and importers select an ocean line, which in turn determines the port routing, which best fits into the ocean carriers vessel rotation and fleet deployment. Therefore, in most cases these exporters and importers are "port blind". If the ocean carrier routes cargo via another Port, the exporter/importer will not be impacted given the expected time of arrival (ETA) is not altered.

The employment with these exporters and importers is driven by the demand for the products that are exported and imported, not by the use of one port or another. Conversely, these jobs with exporters and importers using steamship lines that call the Port of Oakland are classified as related jobs, not port generated or port dependent. It is to be emphasized, though, that it is likely that the existence of the Port of Oakland

does act as a catalyst for economic development, especially for firms that are involved in the distribution of exports and imports.

In contrast, a business that has a private terminal at a port is classified as port dependent if the use of that terminal is key in the future of the firm's existence in the region. For example, if a scrap metal business is geared to ship and receive final products or raw materials only over its own terminal, then the employment with this firm would be classified as port dependent. These port dependent users are typically moving break bulk or bulk cargoes, rather than containerized cargo.

The next section of this chapter is dedicated to the direct impact category of 6,692 jobs for California residents.

3. DIRECT JOB IMPACTS

As a result of maritime activity at the Port of Oakland, 6,692 full-time jobs were directly created. A full-time job is estimated as follows. Based on the average number of hours worked annually in each job category, the total person-hour impact for that category is converted into full-time equivalent jobs. For example, two workers who are involved with port activity only 50 percent of the year would be counted as only one full-time equivalent job.

In this section the direct full-time jobs are analyzed in terms of:

- . Distribution by economic sector
- . Distribution by commodity group
- . Distribution by place of residence.

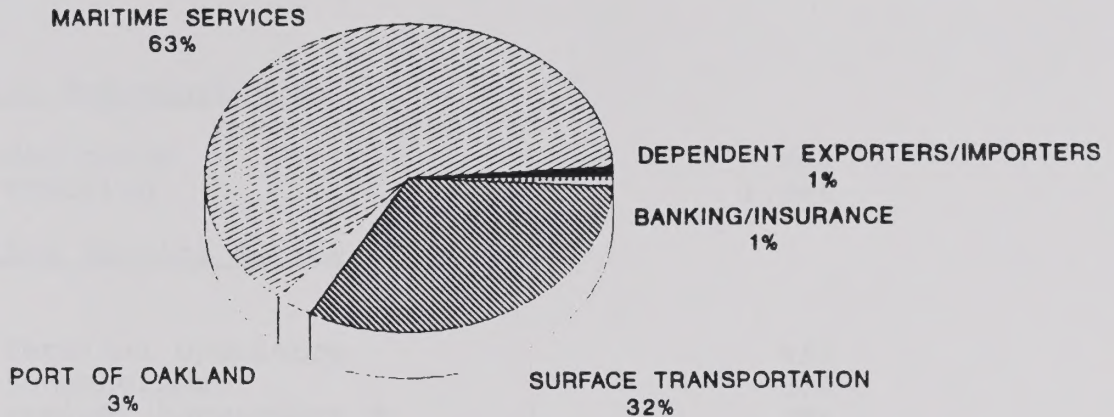
These distributions are developed in more detail below.

3.1 Job Impacts by Sector

Figure III-1 presents the distribution of the 6,692 direct jobs among the following economic sectors:

- . Maritime service sector: for example longshoremen, terminal operators, freight forwarders, steamship agents and steamship lines, and warehousing
- . Surface transportation sector: railroads and trucking firms servicing the Port of Oakland
- . Port dependent users of the Port of Oakland
- . The Port of Oakland
- . Banks and insurance sector.

FIGURE III-1
Distribution of Employment Impact
by Economic Sector
1990



The figure indicates that the majority of impacts, 63 percent, is created in firms supplying maritime services, while the surface transportation service sector accounted for 32 percent of the direct job impacts.

Table III-1 shows the job impacts by detailed job category. As this table shows, the largest job impacts are with trucking firms, warehousemen/CFS operations and transloading operations, the military, the ILWU, railroads, freight forwarders, steamship agents and lines, and terminal operators.

TABLE III-1
Employment Impacts within the Economic Sectors
1990

ECONOMIC SECTOR AND BUSINESS CATEGORY	DIRECT EMPLOYMENT
--	-------------------

Surface Transportation

Railroads	566
Trucking	1,546

Maritime Service Sector

Terminal Operators	411
Longshoremen	572
Freight Forwarders *	558
Warehouse/Container Repair & Leasing**	947
Shipping Agents/Lines	472
Government	157
Military***	836
Chandlers/Surveyors	30
Pilots/Support	13
Harbor Assist	32
Linehaul Towing/Bunkering	27
Ship Repair/Marine Construction	148

<u>Port of Oakland</u>	202
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<u>Banking/Insurance</u>	75
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<u>Port Dependent Exporters/Importers</u>	100
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<u>TOTAL</u>	<u>6,692</u>
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Note: This table does not include related exporters and importers because jobs with those firms are included within the related jobs category, as described in another section of this chapter.

* Includes customhouse brokers and third party carriers

** Includes CFS and transloading operations

***Includes Army, Navy, Coast Guard and Army Corps of Engineers

3.2 Direct Job Impacts by Commodity

Most of the 6,692 jobs considered to be generated by port activity can be related to the handling of specific commodities or commodity groups. Certain employment sectors such as marine construction; state, Federal and local government agencies; the military, and the insurance and banking sectors are extremely difficult to assign to specific commodity groups, and if such an assignment is made, it is often done so arbitrarily. As a result, employment in these three groups (which totaled 1,216) was not allocated to commodity groups.

Table III-2 presents the relative employment impacts in terms of commodity groups.

TABLE III-2
Distribution of Direct Job Impact By Commodity
1990

COMMODITY GROUP	DIRECT JOBS	PERCENT OF ALLOCATED JOBS
CONTAINERIZED CARGO: DRY	4,656	85.03%
CONTAINERIZED CARGO: REFRIGERATED	592	10.81%
BREAK BULK CARGO	228	4.16%
TOTAL ALLOCATED JOBS	5,476	100.00%
JOBS NOT ALLOCATED BY COMMODITY	<u>1,216</u>	
TOTAL DIRECT JOBS	<u><u>6,692</u></u>	

Table III-2 indicates that in 1990, dry containerized cargo is responsible for generating about 85 percent of the direct jobs resulting from port activity, while these same commodities represent about 80 percent of the total metric tonnage handled via the Port of Oakland. Refrigerated containerized cargo generated about 11 percent of the direct job impact, and accounted for about 15 percent of the metric tonnage. Finally, breakbulk cargo, which consists primarily of iron and steel products generated about 4 percent of the job impact and 5 percent of the port-wide metric tonnage.

A description of the distribution of the direct job impacts associated with each commodity group in both international and domestic trade is provided in the remainder of this section.

. Containerized Cargo - Dry

In 1990, nearly 7 million metric tons of dry containerized cargo, or 598,769 containers (both full and empty and excluding refrigerated boxes) passed through facilities at the Port of Oakland creating 4,656 direct jobs, or in-other-words about 7.8 jobs per 1,000 containers are generated. The majority of the jobs, 60 percent, are with firms in the maritime services sector. Within the maritime service sector, jobs are concentrated with warehousing (803 jobs, including CFS, and transloading operations, and container repair and leasing), forwarders and customhouse brokers (532 jobs), the ILWU (481 jobs), steamship agents and lines (472 jobs), and terminal operators (368 jobs).

Thirty-six percent of the 4,656 direct jobs created by handling containerized cargo was concentrated in the surface transportation (rail and truck) sector. The majority of these transportation jobs, 70 percent, are in the trucking industry, reflecting the fact that about 66 percent of the containers moving via the Port of Oakland are transported between the Port and inland destinations by truck. The trucking impact also includes the drayage of containers between the terminals and the intermodal rail yards.

. Containerized Cargo - Refrigerated

In 1990, it is estimated that about 1.2 million metric tons of refrigerated containerized cargo moved over the Port of Oakland facilities, in both foreign and domestic trade. This represents about 64,000 refrigerated boxes. The movement of refrigerated cargo generated 592 direct jobs. Of these direct jobs, 60 percent are concentrated in the surface transportation (rail and truck) sector. Within the surface transportation sector, 85 percent of the jobs are

with trucking firms, reflecting both the transport of the source-loaded refrigerated cargo, and the drayage impact associated with refrigerated cargo moving to and from the Port via rail. The majority of the refrigerated cargo moving by rail is also transloaded.

Within the maritime service sector, the majority (114 jobs) of the direct jobs created by refrigerated cargo is generated with warehouse operators, including transloading operations. Fifty-two full time jobs with the ILWU are created by the refrigerated cargo operations.

. Break Bulk Cargo

The Port of Oakland handled an estimated 387,400 metric tons of break bulk cargo in 1990. The majority of this break bulk cargo consists of iron and steel products. As a result of the 387,400 metric tons of break bulk cargo, 228 direct jobs were generated. The majority of these jobs, 44 percent, is with a private terminal operators directly dependent upon the Port of Oakland, followed by jobs with trucking firms and the ILWU.

3.3 Job Impacts per Container/Refrigerated Container

The assessment of the job impacts on a per container (dry and refrigerated) basis provides a tool for port planners to use in evaluating the relative importance of different commodities as economic generators. Table III-3 presents the job impacts per 1000 containers for dry and refrigerated cargo and per 1000 metric tons for break bulk commodities moving via the Port of Oakland. As this figure indicates, refrigerated cargo generates the greatest impact per 1000 containers, followed by dry containerized cargo. The higher job impact per 1000 containers for refrigerated cargo reflects the labor intensiveness of this type of cargo in the loading and off-loading process. For example, a large percentage of the refrigerated cargo moving via rail is transloaded at facilities in the Port area, whereby the refrigerated cargo is off-loaded from a refrigerated box car and then reloaded into a refrigerated marine container for the export move. This same transloading process also occurs for imported refrigerated cargo, except in the reverse order i.e., the refrigerated cargo is removed from the imported refrigerated container and transloaded into a refrigerated box car for the journey to the final inland destination.

TABLE III-3
Direct Job Impacts per 1,000 Containers and per 1000
Metric Tons
1990

COMMODITY GROUP	JOBS PER 1000 CONTAINERS	JOBS PER 1000 TONS
CONTAINERS: DRY	7.8	NA
CONTAINERS: REFRIGERATED	9.3	NA
BREAK BULK	NA*	0.74

* NOT APPLICABLE

3.4. Distribution of the Direct Jobs by Place of Residency

The widespread geographic impact of the Port of Oakland can be demonstrated by evaluating the residency patterns of those directly employed by marine cargo activity at the Port of Oakland. To estimate the distribution of the direct job impacts by residency, the respondents to the survey provided the location of residency of their employees. For tucking, the results of a Port of Oakland analysis of a Truck Origin and Destination survey was used to estimate the residency of truckers serving the Port of Oakland.

Table III-4 shows the distribution of the employment impact of the Port of Oakland, by county in the Bay Area.

TABLE III-4
Distribution of Direct Employment Impact
by County of Residence
1990

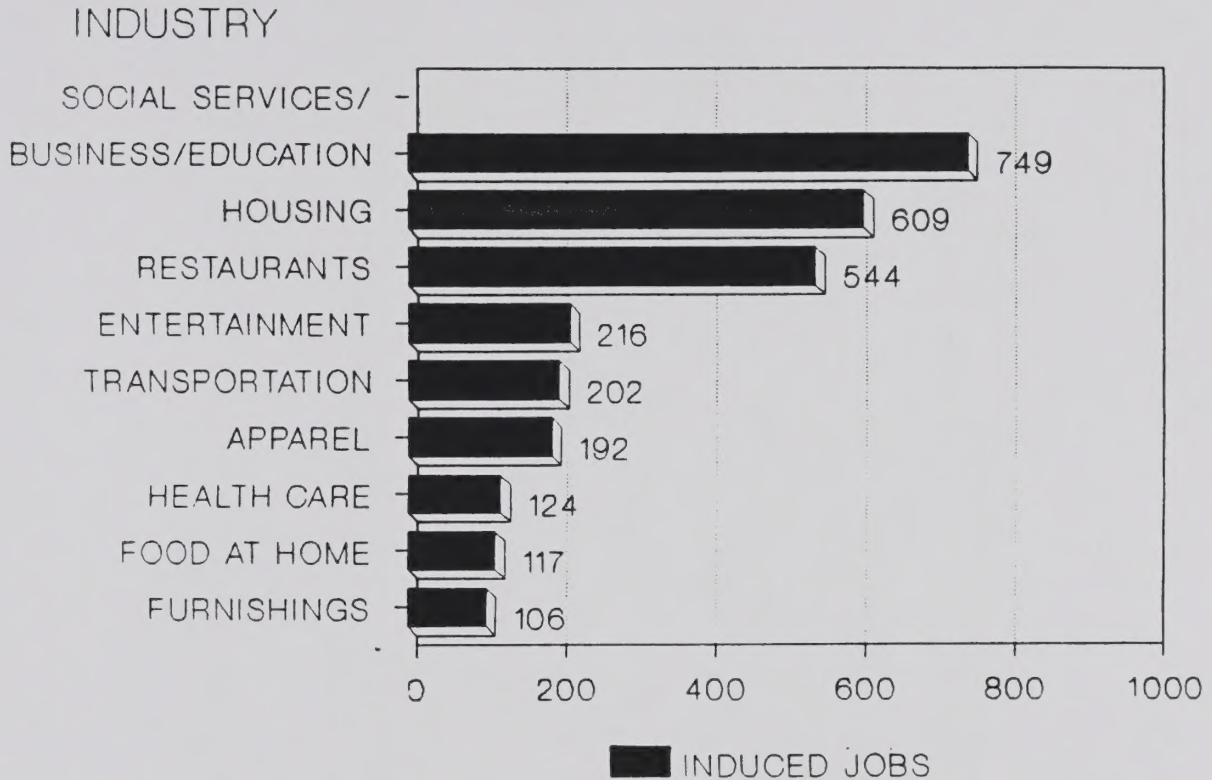
COUNTY OF RESIDENCE	DISTRIBUTION
ALAMEDA	43.60%
CONTRA COSTA	12.23%
SAN FRANCISCO/SAN MATEO	23.37%
SANTA CLARA	1.75%
MARIN/NAPA/SONOMA/SOLANO	5.97%
SACRAMENTO	1.36%
OTHER	11.73%

Note: In Table III-4 rail employees are not included since a majority of the rail impact occurs with crewmen who reside throughout the U.S.

4. INDUCED JOBS

The in-state purchases by the 6,692 direct job holders with the direct income earned from port activity creates additional jobs throughout the Bay Area. In 1990, \$220.5 million dollars was received by those 6,692 directly employed by activity at the Port of Oakland. As the result of the respending of a portion of this income for purchases in the Bay Area, an additional 2,859 induced jobs were generated throughout the Bay Area. The distribution of these induced jobs by industry is presented in Figure III-2.

FIGURE III-2
Distribution of Induced Job Impact by Industry
1990



These induced jobs are estimated based on the current expenditure profile of residents in the Bay Area, as estimated by the U.S. Bureau of Labor Statistics, "Consumer Expenditure Survey". This survey indicates the distribution of consumer expenditures over key consumption categories for Bay Area residents. The consumption categories are:

- . Housing
- . Food at Restaurants
- . Food at Home
- . Entertainment
- . Health Care
- . Home Furnishings
- . Transportation Equipment and Services

The estimated consumption expenditure generated as a result of the respending impact is distributed across these consumption categories. Associated with each consumption category is the relevant retail and wholesale industry. Jobs to sales ratios in each industry are then computed for the Bay Area, and induced jobs are estimated for the relevant consumption categories. It

is to be emphasized that induced jobs are only estimated at the retail and wholesale level, since these jobs are most likely generated in the Bay Area. Further levels of induced jobs are not estimated since it is not possible to defensibly identify geographically where the subsequent rounds of purchasing occur.

"The Consumer Expenditure Survey" does not include information to estimate the job impact with supporting business services, legal, social services and educational services. To estimate this induced impact, a ratio of state of California employment in these key service industries to total state of California employment is developed. This ratio is then used with the direct and induced consumption jobs to estimate induced jobs with business/financial services, legal, educational and other social services.

5. RELATED JOBS

A survey of 74 shippers/consignees using the Port of Oakland was conducted to determine the ratio of jobs to waterborne cargo movements. The results of the surveys were then used to develop jobs to container and metric ton ratios for containerized cargo, refrigerated cargo and break bulk cargo. These jobs to container and ton ratios were then applied to the local containers and tonnage moving via the Port of Oakland to estimate related jobs in the Bay Area.

About 60 percent of the dry containerized cargo moving via the Port is estimated to originate or be consumed by Bay Area firms. Using this methodology, it is estimated that about 157,100 jobs are with local users of the Port of Oakland for the shipment and receipt of dry containerized cargo.

About 50 percent of the refrigerated containerized cargo is estimated to be locally produced or consumed, in turn resulting in about 1,200 related Bay Area jobs.

Finally, as a result of the shipment and receipt of break bulk products via the Port of Oakland, about 21,000 jobs are estimated to be related to these cargo movements.

In total, it is estimated that about 179,300 jobs with Bay Area firms are related to cargo movements via the Port of Oakland. These firms are only users of the Port and not dependent upon the Port, since they typically use multiple ports for marine transportation. Again, it is to be emphasized that these are related jobs, not direct jobs.

APPENDIX

The purpose of this appendix is to provide a description of the consultant, an overview of the methodology, and a discussion of how the methodology used for this study differs from other approaches to estimating the economic impacts of a seaport, primarily the input-output approach.

1. DESCRIPTION OF THE CONSULTANT

Martin O'Connell Associates was retained by the Port of Oakland to measure the local and regional economic impacts generated by marine cargo activity at terminals located in Oakland. Martin O'Connell Associates was founded by Dr. John C. Martin and Mr. James D. O'Connell to provide consulting services to the port and maritime industries. These services include:

- . Economic Impact Analyses for Seaports and Airports
- . Port Master Planning
- . Economic and Financial Feasibility Analyses of Capital Intensive Projects
- . Market Analysis
- . Strategic Planning
- . Litigation Support and Expert Witness Testimony
- . Ocean Carrier Cost Analysis and Fleet Deployment Strategies
- . Commodity Flow Analyses and Forecasting
- . Surface Transportation Cost Analysis
- . Intermodal Analysis and Rail/Port Interface Planning
- . Facilities Planning and Analyses.
- . Operational and Efficiency Analyses

Since its founding in 1986, our client list has grown to include:

- . Alcoa Steamship Company
- . American President Lines, Ltd.
- . Bethlehem Steel Corporation
- . Canadian Coast Guard
- . Canadian Justice Department
- . Casco Bay Island Transit District
- . Colombian Ports System
- . Communaute Urbaine de Brest (France)
- . Costa Rican Ports System
- . Crowley Maritime
- . General Mitchell International Airport (Milwaukee)
- . Georgia Ports Authority

- . Greater Baltimore Committee
- . Green Bay Port Authority
- . International Longshoremen's Association
- . IU International
- . Lancaster Pennsylvania Chamber of Commerce and Industry
- . Lancaster Pennsylvania Municipal Airport
- . Maine Department of Transportation
- . Maryland Port Administration
- . Meehan Seaway Services
- . Minneapolis/St. Paul International Airport
- . Milwaukee World Festivals
- . Narragansett Bay Ports
- . Oregon Department of Economic Development, Ports Division
- . Port of Brunswick, Georgia
- . Ports Canada
- . Port Longview
- . Port of Houston
- . Port of Humboldt Bay (California)
- . Port of Milwaukee
- . Port of Oakland
- . Port of Philadelphia, Philadelphia Regional Port Authority
- . Port of Portland, Maine
- . Port of Providence, Rhode Island
- . Port of Richmond, Virginia
- . Port of Seattle
- . Port of Xiamen, China
- . Saint Lawrence Seaway Development Corporation
- . Saint Lawrence Seaway Authority
- . Port of Saint John, New Brunswick
- . San Francisco International Airport
- . South Louisiana Port Commission
- . Stapleton Airport, Denver
- . Thunder Bay Economic Development Corporation
- . Toronto International Airport
- . U.S. Merchant Marine Academy
- . Washington Dulles International Airport
- . Washington National Airport
- . Windsor Harbour Commission

The methodology used in this analysis for the Port of Oakland has been developed by Martin O'Connell Associates and used in the last three years to estimate the economic impacts of seaport activity at more than 70 United States and Canadian ports, including:

- . Philadelphia, Pennsylvania
- . Seattle, Washington
- . Baltimore, Maryland
- . Providence, Rhode Island
- . Houston, Texas

- . Richmond, Virginia
- . Brunswick, Georgia
- . Longview, Washington
- . Montreal, Quebec
- . Saint John, New Brunswick
- . St. John's, Newfoundland
- . Halifax, Nova Scotia
- . Quebec City, Quebec
- . Trois Rivieres, Quebec
- . Prince Rupert, British Columbia
- . Vancouver, British Columbia
- . Thunder Bay, Ontario
- . Windsor, Ontario

2. METHODOLOGY

This section describes the overall economic impact methodology used by Martin O'Connell Associates to estimate the economic impacts of maritime activity at the Port of Oakland.

2.1 Economic Impact Structure

A deepwater port such as the Port of Oakland contributes to the local, regional, and national economies by providing employment and income to individuals, tax revenues to local and state governments, customs fees to the Federal Government, and revenue to businesses engaged in handling, shipping, and receiving cargo via the Port.

These impacts affect the whole economy. For analysis of maritime operations, these impacts can be described as being generated by businesses within five defined sectors of the economy. These business sectors are:

- . The Surface Transportation Sector consists of the trucking companies and railroads moving cargo to and from the Port of Oakland.
- . The Maritime Service Sector includes the firms providing cargo marine transportation; vessel operations; cargo handling; federal, military and city agencies overseeing port activity at Oakland; and marine construction and repair.
- . The Port Sector consists of Port of Oakland employees which support maritime activity.
- . The Banking and Insurance Sector consists of local banks, insurance firms and also attorneys directly dependent upon maritime activity at the Port of Oakland.
- . The Exporters/Importers Sector includes businesses that export and import cargo through the Port of Oakland.

Within the impact sectors there are businesses defined as directly dependent upon the Port of Oakland as well as businesses defined as only related to the Port's maritime activities. The business activity of those firms that are directly dependent upon the Port of Oakland is directly generated by the Port's maritime operations. These businesses provide maritime services related to the movement of cargo over the Port facilities. If the Port of Oakland were not available as a seaport, these businesses would cease operations, close local offices, and/or eliminate those jobs dependent upon the Port of Oakland maritime activity.

An example of a directly dependent business would be a shipping line which has a long term berth lease at the Port of Oakland terminals. If the Port eliminated the seaport operations, that shipping line would cease its operations related to Oakland, close local offices, and eliminate all jobs dependent upon Oakland operations. The closing of that shipping line's Oakland operations would have a ripple effect on other Port of Oakland dependent businesses. For example, longshoremen jobs associated with the shipping line's Oakland operations would be lost as well as jobs associated with vessel assistance.

Firms classified as directly dependent upon the Port of Oakland are in the Surface Transportation Sector, the Maritime Services Sector, the Port Sector, and the Banking and Insurance Sector. In addition, a portion of the businesses in the Exporters/Importers Sector are classified as directly dependent upon the maritime operations at the Port of Oakland. This is the case for a scrap metal exporting/importing business that maintains its own private terminal at the Port of Oakland. This type of business could no longer continue operations if the Port were not available for shipping.

Other exporters/importers are classified as related businesses. Related businesses are treated separately from directly dependent businesses. Related businesses would not stop operations if the Port of Oakland ceased the seaport activity. These related businesses have cargo that is shipped or received via multiple ports, including the Port of Oakland. The geographic location of businesses in the related group or their proximity to a port does not limit or directly affect their business activity. Business activity is determined by the demand for the export/import product, not the port used.

An example of a related business is an automotive assembly plant which imports vehicle parts that are used in the assembly of cars sold through local auto dealerships. Another example is a wholesale firm which imports toys to be distributed through retail stores. A final example is an agricultural business which exports poultry, meats, or fresh fruits and vegetables for consumption overseas. It is important to underscore that these businesses use multiple ports. These related exporters/importers further have the ability to substitute other ports for the Port of Oakland, with minimal impacts on business operations.

2.2 Economic Impacts

Four types of economic impacts are generated in the five economic impact sectors. These impacts are the job impacts, revenue impact, personal earnings impact, and the tax impact. Each of these impacts are discussed below.

2.2.1 Job Impacts

The purchase of jobs by businesses that are directly dependent upon the Port of Oakland generates direct job impacts. These directly employed persons, such as people in stevedoring services, receive wages and salaries, which result in a direct income impact. Since these individuals directly hired by the firms providing cargo handling and vessel services also purchase goods and services with the newly generated income, a re-spending of this income throughout the local and regional economies is also created. This re-spending effect, known as the personal income multiplier effect, in turn creates additional induced jobs in business which supply those goods and services to those spending their earnings. An example of induced jobs would be the people employed at a local grocery store where the stevedore clerk buys his groceries. Another example is the staff in a dentist's office where a truck driver has his/her teeth cleaned.

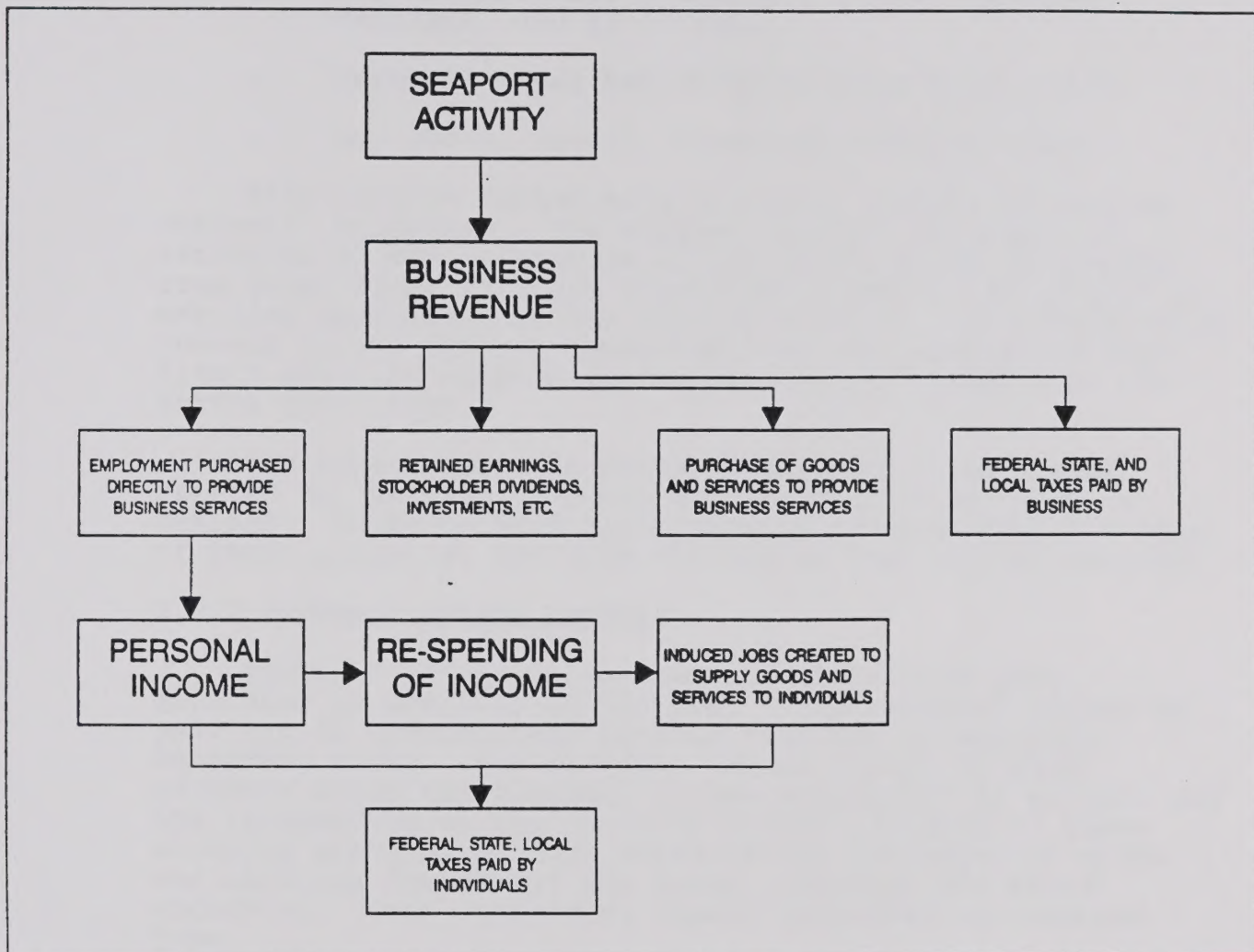
The purchase of jobs by businesses which are defined as related to, but not dependent upon, the Port of Oakland generates employment defined as related jobs. These related jobs are employees with exporters and importers who ship and receive cargo over the Port of Oakland marine terminals as well as other ports.

Related jobs are somewhat similar to indirect jobs. Indirect jobs are defined as those jobs which are created due to the purchases of goods and services by businesses, not by individuals, directly dependent upon the maritime activity at the Port of Oakland. Indirect jobs are not estimated in this Port of Oakland economic impact analysis. This is because the regional spending patterns of businesses providing services to the Port of Oakland cannot be traced with any degree of accuracy. The related jobs analyzed in this study, though, are based on a quantitative relationship which can be traced. A comparison of the input/output methodology which attempts to measure indirect jobs, to the methodology of this study, is provided in another section of this appendix.

2.2.2 Business Revenue Impact

The activity at the Port of Oakland, i.e. vessel calls and the loading and discharging of cargo, immediately generates business revenue to the directly dependent firms which provide cargo handling and vessel services. Exhibit A-1 shows how this revenue flows throughout the economy.

EXHIBIT A-1
Flows of Economic Impacts Through the Economy



The revenue generated by seaport activity is used to:

- . purchase employment to provide the services,
- . pay stockholders dividends, accrue retained earnings, and to invest,
- . purchase goods and services from other firms,
- . pay local, county, state and Federal taxes.

This revenue impact affects local, state, as well as national economies. The revenue impacts are based on estimates of the percentage of business revenue generated from local firms directly dependent in whole, or in part on maritime operations at the Port of Oakland. In effect, this revenue is the revenue generated from the portion of each firm's activity related to the movement of cargo over the Port's facilities.

Business revenue is not estimated for those firms related to, but not directly dependent upon the Port of Oakland. These related firms receive revenue from the sale of their products, not from the use of the Port of Oakland.

2.2.3 Personal Income Impacts

Personal income is associated with direct jobs generated by activity at the Port. The personal income is paid out of the business revenue received by directly dependent firms. The personal income impact is then adjusted using the personal income multiplier to account for the re-spending of the personal income received by those directly employed by port activity for purchases of goods and services throughout the local, regional and state economies. This respending impact generates the induced jobs.

2.2.4 Tax Impacts

Local, county, state and federal tax impacts are derived from business revenue and from personal income generated by business activity that is directly dependent upon the Port.

3. BUSINESS SECTOR ANALYSIS

Cargo handling and vessel operations at the Port of Oakland generate the four economic impacts (jobs, revenue, personal income, and taxes) in various business categories within the five economic sectors:

- . Surface Transportation Sector
- . Maritime Service Sector
- . Exporters/Importers Sector
- . Port Sector
- . Banking and Insurance Sector.

A description of the major business categories within each sector is presented in the next section.

3.1 The Surface Transportation Sector

The surface transportation sector consists of both the railroad and trucking industries. These businesses are responsible for moving the various cargoes between the Port and their inland origins and destinations. The railroads are involved in intermodal movements of dry and refrigerated containerized cargo between the Port and inland destinations such as Northern and Southern California, Nevada, the Pacific Northwest, Chicago, Houston, and New York.

Many local and national trucking firms serve the Port of Oakland, as do numerous individual owner-operators. The trucking industry's major involvement is in moving dry containerized cargo and refrigerated containerized cargo source-loaded in the agricultural regions of California and the Pacific Northwest. Also, trucking firms provide drayage services between the container terminals and intermodal rail yards.

3.2 The Maritime Service Sector

This sector consists of numerous firms and participants performing functions related to the following maritime services:

- . Cargo Marine Transportation
- . Vessel Operations
- . Cargo Handling
- . Federal, State, and Local Government Agencies.

A brief description of the major participants in each of these five categories is provided below:

- . Cargo Marine Transportation

Participants in this category are involved in arranging for inland and water transportation for export or

import freight through the Port of Oakland. The freight forwarder/customshouse broker is the major participant in this category. The freight forwarder/customshouse broker arranges for the cargo to be delivered between the Port and inland destinations, as well as the ocean transportation. Customshouse brokers are often freight forwarders who assist with the documentation and clearing of U.S. Customs for imported cargo.

. Vessel Operations

This category consists of several participants involved in overseeing vessel operations and coordination with surface transportation.

- Shipping Line Agents - provide a number of services for the vessel as soon as it enters the Port; the agents arrange for pilot services and towing, for medical and dental care of the crew, and for ship supplies. The agents are also responsible for vessel documentation, pricing, equipment tracking and availability, and marketing. In some cases the agency work is performed by a division of the steamship company, while other times the agency work is done by a private company representing several shipping lines.
- Shipping Lines - include shore-side employees of shipping lines serving the Port of Oakland. These shore-side employees are responsible for pricing, marketing, container tracking, claims processing, equipment utilization, billing, intermodal operations and fleet deployment. Some shipping lines operate their own ocean terminals under long term leases with the Port. At these terminals a division of the line often provides the stevedoring services. Only those employees dedicated to vessels calling, and cargo moving, via the Port of Oakland are included in the direct employment impact. Employment at Oakland based steamship line headquarters that is not dedicated to Port of Oakland operations is not counted in this impact study.
- Chandlers - supply the vessels with ship supplies (food, clothing, nautical equipment, etc.)
- Towing firms - provide the tug service to guide the vessel to and from port

- Bunkering firms - provide fuel to the vessels
 - Marine surveyors - inspect the vessels and the cargo, as well as the containers. Typically the surveys are done in support of claims by exporters and importers.
 - Launch services - provide transportation for the crew between land and vessel
 - Shipyards/marine construction firms - provide repairs, either emergency or scheduled as well as marine pier construction and dredging. Also included in this category are one-time impacts generated by the construction of marine facilities.
- . Cargo Handling - This category involves the physical handling of the cargo at the Port between the land and the vessel. Included in this category are the following participants:
- Longshoremen - are members of the International Longshoremen's and Warehousemen's Union (ILWU), and are involved in the loading and unloading of cargo from the vessels, as well as handling the cargo prior to loading and after unloading
 - Stevedoring firms - manage the longshoremen and cargo-handling activities
 - Terminal operators - are often stevedoring firms or ocean carriers (operating proprietary terminals) who operate the maritime terminals where cargo is loaded and off-loaded
 - Warehouse operators - store cargo after discharge or prior to loading and consolidate cargo units into shipment lots. Also, included in this category are firms providing Container Freight Station (CFS) operations, as well as transloading services, particularly for the refrigerated cargo moving to and from the Port by rail.
 - Container leasing and repair firms - provide containers (both dry and refrigerated) to steamship lines and exporters and importers and repair damaged containers.
 - Container consolidators - consolidate containerized cargo as well as full containers in order to achieve favorable transportation rates

for their customers. Also included in this category are NVOCC's (non-vessel operating common carriers). These types of firms are sometimes freight forwarders and customhouse brokers, and their key function is in consolidating less-than-container load (LCL) shipments into container size shipments. The freight forwarder function often associated with such consolidators or NVOCC's is included in the marine cargo transportation category.

- . Government Agencies - This service sector involves federal, state and local government agencies that perform services related to cargo handling and vessel operations at the Port. This category includes U.S. Customs, U.S. Food and Drug Administration, the U.S. Department of Agriculture, the City police and fire departments, and the U.S. military. This military group includes the U.S. Army, Coast Guard, Navy, and the Army Corps of Engineers.

The presence of the U.S. military at the Port of Oakland is demonstrated by the following description of the Oakland Army Base. The Military Traffic Management Command (MTMC) Western Area is the principal activity headquartered at the Oakland Army Base. MTMC was established in February 1965, to serve as the single-manager operating under the secretary of the Army for Department of Defense military traffic management, land transportation, and the operation of common-user ocean terminals in the continental United States and in some overseas areas. MTMC Western Area is responsible for the movement of Department of Defense cargo throughout the 20 western states all the way to the Indian Ocean. Also, Western Area manages inland traffic throughout the 20 western states, including the movement and non-temporary storage of household goods throughout those CONUS states and Hawaii. The command has three subordinate commands which support the command in the performances of these missions:

- Transportation Terminal Command West Coast, located at Oakland is responsible for MTMC Western Area CONUS port operations at:
 - .. Military Ocean Terminal Bay Area, located in Oakland
 - .. Southern California Outport, located in Compton, CA
 - .. Pacific Northwest Outport, located in

Seattle, WA

- Transportation Terminal Command Far East is headquartered in Seoul, Korea and manages MTMC activities in the Far East. This command reports directly to MTMC Western Area Headquarters in Oakland during peacetime
- MTMC Western Area also oversees the operations of ten Military Air Traffic Coordinating Units.

Also, the Military Sealift Command, Pacific Headquarters is located in Oakland, as is the U.S. Navy Supply Center.

3.3 Exporters/Importers Sectors

Businesses export and import cargo through the Port of Oakland for manufacturing purposes, for distribution to wholesale and retail outlets, as well as for other business purposes.

As described in section 2, two types of exporters and importers are considered in this analysis: Those that are totally dependent on the Port of Oakland and maintain private terminals at the Port, and those located throughout the Bay Area whose business is only related to the Port of Oakland.

Those in the first category would most likely shut down operations if the Port of Oakland were not available for their use, while those in the second category would ship or receive materials via another port. Because of this difference, employment, revenue, income and tax impacts are estimated for port users in the first category only. Employment with port users in the second category is considered port-related, and not port-generated. For this group, no income, revenue and tax impacts are estimated.

3.4 Port Sector

The Port of Oakland includes those individuals employed whose purpose is to oversee port activity and support the Port's maritime operations. The Port designs, constructs and maintains the seaport facilities. In addition, the Port provides preferentially assigned facilities to steamship lines, as well competitive multi-user public facilities for steamship lines that prefer to use public terminals.

3.5 Banking and Insurance Sector

While this sector is not directly involved in cargo or ship operations, it nonetheless does provide services such as financing export/import transactions and insuring cargo and vessels. Included in this sector are banks providing international trade financial transactions, such as the issuance of letters of credit, legal firms specializing in maritime law, and insurance firms providing hull and cargo insurance.

4. COMMODITIES INCLUDED IN THE ANALYSIS

A major use of an economic impact analysis is to provide a tool for port development planning. As a port grows, available land and other resources for port facilities become scarce, and decisions must be made as to how to develop the land and utilize the resources in the most efficient manner. Various types of facility configurations are associated with different commodities. For example, a container terminal requires a large, paved area for storage, and the size of the back up space required is determined by the type of terminal operations. For example a stacked container operation compared to a wheeled operation requires less back-up space. Handling equipment differs as well, with containerized cargo requiring specialized, highly automated cranes. Refrigerated containers require electrical hook-ups and transloading facilities. Investments in these facilities is very costly, and there is often a need for the Port to demonstrate the pay-offs of these investments in terms of economic benefits.

An understanding of a commodity's relative economic value in terms of employment and income to the local community, the cost of providing the facilities, and the relative demand for the different commodity groups is essential in making future port development plans. Because of this need for understanding relative commodity group impacts, economic impacts are estimated for the following commodity groups handled via public facilities and one private facility at the Port of Oakland:

- . Containerized cargo - Dry
- . Containerized Cargo - Refrigerated
- . Break bulk cargo, including steel products, yachts, military vans, and heavy lift project cargo

It should be emphasized that commodity-specific impacts are not estimated for each of the five economic sectors described in the last section. Specific impacts could not be allocated to individual commodity groups with any degree of accuracy for the banking and insurance sector, marine construction and the government sector. In addition, taxes have not been displayed by specific commodity, since these tax impacts will reflect the same distribution over commodities as the employment impact.

5. DATA COLLECTION

This Economic Impact Study of the Port of Oakland is based on a telephone survey of 387 different businesses within the maritime community at the Port of Oakland. The participants were identified from the Port of Oakland, Journal of Commerce's "Telephone Tickler", and the Pacific Shipper's "Coast Marine and Transportation Directory".

Key areas of interest included in the telephone survey are:

- . Name of company
- . Respondent's name and position
- . Number of full time individuals totally dependent upon the Port of Oakland
- . Percent of Bay Area business that is generated by cargo moving over the Port of Oakland facilities
- . Average salary (excluding benefits)
- . Payroll as a percent of revenue.
- . Percent LCL and percent transload
- . Tonnage per dry container and refrigerated container
- . Modal split for each commodity
- . Local expenditures

In addition to data collected from the 387 interviews, published data was collected from several sources. These publications are for the Oakland Standard Metropolitan Statistical Area and the state of California, and include the following U.S. Bureau of Census Publications:

- . Census of Wholesale Trade, 1987 published in 1989.
- . Census of Retail Trade, 1987 and published in 1989.
- . Census of Construction, 1987, and published in 1990.
- . Census of Service Industries, 1987 and published in 1989

Other published data included U.S. County Business Patterns, 1987 for the state of California, 1987 and published in 1989 and U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, 1989.

Table A-1 summarizes the interview responses.

TABLE A-1
Summary of Interviews

CATEGORY	INTERVIEWS CONDUCTED
FREIGHT FORWARDERS	97
NVOCC'S	22
WAREHOUSE/CFS	45
STEAMSHIP AGENCIES/LINES	42
TERMINAL OPERATORS/STEVEDORES	7
RAILROADS	4
CHANDLERS	3
TUG ASSISTS	11
TRUCKING	11
MISCELLANEOUS	6
CONTAINER LEASING	6
SHIP REPAIR	3
CRANE REPAIR	1
CONTAINER REPAIR	2
DREDGING CONTRACTOR	4
MARINE EQUIPMENT	4
MARINE SURVEYORS	5
ATTORNEYS	9
BANKS	22
GOVERNMENT/MILITARY	9
EXPORTERS/IMPORTERS	74
TOTALS	387

The economic relationships and methodology have been modeled using Lotus software. This model has been designed to update the port impact assessment on an annual basis, as well as to test sensitivities of impacts to changes in dry and refrigerated container throughput, break bulk tonnage, labor productivity, labor work rules, vessel calls (by type of vessel), pilotage and tug assist assumptions, and inland distribution patterns. Also, the model is designed to test the impacts under alternative dredging scenarios and of new facilities development.

6. COMPARISON OF THE MARTIN O'CONNELL ASSOCIATES IMPACT METHODOLOGY WITH INPUT/OUTPUT MODELS

In order to guarantee defensibility and accuracy of results, no input/output models were used in this study to estimate induced and indirect jobs. The lack of defensibility and accuracy arising from the use of input/output models are the result of the following facts:

- . The sectors of an input/output model are very large and not consistent with seaport activities. For example, the transportation sector of an input/output model contains a myriad of activities, such as warehousing (both domestic and international), freight forwarders (domestic, air, marine, international, etc.), and freight handling (including rail, air, water, truck). The technical coefficients (for this sector) relating expenditures to jobs, is thus a combination of many activities, most of which are actually unrelated to seaport activity.
- . It is not possible to accurately trace how revenue is spent by maritime firms, including:
 - Geographically (in-state, in-county, internationally, out-of-state, out-of-county, etc.)
 - Type of purchase (specific commodity or service purchased).
- . Input/output coefficients are typically driven by national average technical relationships, which are regionalized to a state or county level. Therefore, the use of regionalized national relationships to reflect expenditure patterns of a specific maritime firm providing services at a specific port cannot produce defensible or traceable results.

Furthermore, input/output models do not provide a framework by which the sensitivity of impacts to specific factors can be tested. Such factors include:

- . Commodity mix and throughput
- . Labor productivity
- . Labor work rules
- . Inland transportation patterns
- . Vessel call levels.

As a result, the use of such regionalized input/output models (of which the Marad Port Kit is one such model) does not reflect the actual local characteristics of a seaport (such as

inland modal mix, commodities mix, labor productivity). Furthermore, not only do the impacts measured by regionalized input/output models not reflect the local characteristics of a seaport, but, the results are not defensible and typically do not provide a realistic measure of a seaport's contribution to the regional economy. Finally, the multipliers inherent in the regionalized input/output models tend to inaccurately estimate the indirect and induced impacts, since the multipliers do not realistically reflect geographical responding patterns by firms providing services at seaports.

Because of these shortcomings of previous approaches of impact analysis, Martin O'Connell Associates developed a methodology that was based on the use of seaport specific data, collected through detailed phone and personal interviews. The models developed to estimate economic relationships are estimated using this local data and are further designed to reflect the actual local expenditure patterns. While much more data intensive than the "port kit" approach, this new methodology is designed to produce results that can be traced back to actual sources and spending relationships. Furthermore, the Martin O'Connell Associates methodology recognizes that the contribution of a seaport to an economy cannot be reduced to a single number, but instead the impacts occur as jobs, personal income, business revenue, and state, local and federal taxes. These four types of impacts are estimated by specific, detailed job categories such as rail, trucking, terminal operators, longshoremen, freight forwarders, banking and insurance, etc. The methodology also is designed for impacts to be estimated on a city, county and regional basis. Since the results are estimated at such fine levels of detail, the results can be used for planning purposes, as well as for public relations. Because of these considerations, no input/output models were used.

7. COMPARISON OF METHODOLOGIES BY THE PORT AND MARTIN O'CONNELL ASSOCIATES

The Port of Oakland estimated the economic impacts of maritime activity in 1990 using a previously developed input/output model. The comparisons between the Port of Oakland estimates and the results of this study are presented in table A-2.

TABLE A-2
Comparison of Martin O'Connell Associates Impact Results
and the Port of Oakland Estimates
1990

	PRIOR METHOD PORT OF OAKLAND	NEW METHOD MARTIN O'CONNELL
<u>JOB CATEGORIES</u>	<u>Employment Generated</u>	<u>Employment Generated</u>
Direct	4,454	6,692
Induced	(not able to be estimated)	2,859
Induced & Indirect	8,435	(indirect not estimated)
Direct, Induced & Indirect	12,889	(indirect not estimated)
Related	(not estimated)	179,300
<u>BUSINESS REVENUE (Total)</u>	<u>\$1,172.9 million</u>	<u>(see below)</u>
Personal Income	\$294.5 million	\$430.1 million
Taxes		
local, county & state	(not estimated)	\$38.3 million
local (sales, hotel & utility only)	\$2.5 million	(included above)
Business Revenue	\$875.9 million	\$729.2 million

As this table shows, the Martin O'Connell Associates study estimates about 2,000 more direct jobs than the Port of Oakland model. However, the Port of Oakland model estimates an additional 8,435 induced and indirect jobs are generated due to Port activity. The Martin O'Connell Associates impact model estimates that about 2,900 induced jobs are generated to support the 6,692 direct jobs. No estimate is made of indirect jobs by Martin O'Connell Associates because of the reasons stated above. Mainly, it is not possible to trace with any degree of accuracy the geographic purchases by businesses at every level of



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